Biology 2201 **Name:_____**

Analyzing a Diffusion Laboratory Investigation

Skill Activity - Drawing Conclusions

Diffusion is the process in which molecules of a substance move from areas of higher concentration of that substance to areas of lower concentration. A biology class performed an investigation to determine the effects of concentration and temperature on diffusion. Using their data, given below, analyze the investigation.

Problem

What effect does an increase in concentration and temperature have on the rate of diffusion?

Materials

laboratory balance
spatula
6- 250 ml beakers
ice cubes
glass-marking pencil
hot plate
graduated cylinder
weighing paper
potassium permanganate crystals
clock or stop watch

Procedure

Beaker A	Beaker B	Beaker C	Beaker D	Beaker E	Beaker F
Fill with 200 ml of tap water	Fill with 200 ml of tap water	Fill with 200 ml of tap water	Fill with 200 ml of tap water	Fill with 200 ml of tap water	Fill with 200 ml of tap water
		Place 4 ice cubes in beaker	Place 4 ice cubes in beaker	Heat beaker until water boils	Heat beaker until water boils
Place 5 g of potassium permanganate crystals in beaker.	Place 10 g of potassium permanganate crystals in beaker	Place 5 g of potassium permanganate crystals in beaker	Place 10 g of potassium permanganate crystals in beaker	Place 5 g of potassium permanganate crystals in beaker	Place 10 g of potassium permanganate crystals in beaker
Do not stir.	Do not stir.	Do not stir.	Do not stir.	Do not stir.	Do not stir.
Time how long it took substance to completely diffuse.	Time how long it took substance to completely diffuse	Time how long it took substance to completely diffuse	Time how long it took substance to completely diffuse	Time how long it took substance to completely diffuse	Time how long it took substance to completely diffuse
Record time on lab sheet	Record time on lab sheet	Record time on lab sheet	Record time on lab sheet	Record time on lab sheet	Record time on lab sheet

In summarizing the data, the class arranged the beakers according to the time it took for the potassium permanganate to completely diffuse. The list is shown below.

F Beaker in which potassium permanganate diffused the fastest. **(Hottest, 10g)**
E **Hottest, 5g**
B **Room Temperature, 10g**
A **Room Temperature, 5g**
D **Colder, 10g**
C Beaker in which potassium permanganate diffused the slowest. **(Colder, 5g)**

As part of your analysis of the investigation and the class data, answer the following questions.

1. What effect did the concentration of potassium permanganate have on the rate of diffusion in beakers A and B?__**Increase the rate of diffusion**_____

   In beakers C and D?___**Increased the rate of diffusion**_____

   In beakers E and F?___**Increased the rate of diffusion**_____

2. What effect did the concentration of potassium permanganate have on the rate of diffusion? ___**The higher the concentration, the greater the rate of diffusion**._____

3. What effect did the temperature have on the rate of diffusion? ___**The higher the temperature, the greater the rate of diffusion.**_____

4. Which set of beakers – A and B, C and D, or E and F – served as the control in this investigation? Explain. ____**Beakers A & B, because they had no variables changed.**__

5. Why did the potassium permanganate in beaker F diffuse the fastest? ____**Beaker F diffused the fastest because it contained the highest concentration of potassium permanganate and the highest temperature.**_____

6. What would have happened in beaker D if the concentration of potassium permanganate had been increased? ___**Diffusion would have occurred faster in beaker D than Beaker F.**_____